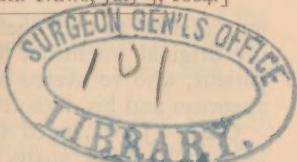


TIFFANY (L. McL.)

COMPLIMENTS OF
Dr. L. McLANE TIFFANY

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A CONTRIBUTION TO THE HISTORY OF
LIGATION OF THE COMMON
FEMORAL ARTERY.¹

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LAST summer it was my fortune to have to deal with a large aneurism of the femoral, extending upwards to within two or three inches of Poupart's ligament, and while pressure, with rest, was being tried to effect a cure, I very naturally turned to the recorded experience of others, with the intention of tying the common femoral artery, if pressure failed. So the first author my hand lighted upon said that, while he preferred to tie the external iliac rather than the common femoral for aneurism high in the thigh, yet he was not prepared to condemn a further trial of the common femoral. My next author was more favorable, for by him the common femoral was preferred to the external iliac. My third author condemned the operation unhesitatingly as not fit to be done, and from the state of depression in which I now was, nothing aroused me until I put my eye on author No. 4, who says that it is the duty of the surgeon to tie the common femoral in preference to the external iliac. I therefore, with care, returned my

¹ Read before the American Surgical Association April 30, 1884.

four advisers to their shelves, and tied, according to my original intention, the common femoral of my patient, who recovered with rapidity both from his aneurism and his doctor.

CASE.—J. W., aged fifty-eight years, male, mulatto, tall, rather spare, noticed in March, 1883, a lump in the left groin. When first discovered, the enlargement was about, so he described it, the size of a pullet's egg, probably an inch and a half by two and one-half inches. During the month of May, increase was rapid. June 17 of the same year, I first saw the patient. The enlargement at that time was oval, extending from within two and one-half inches of Poupart's ligament to within five inches of the upper border of the patella. The circumference of the affected thigh, the left, measured over the most prominent portion of the tumor, exceeded by five inches the circumference of the right taken at a corresponding place. There was decided œdema of the limb below the tumor; pulsation was distensile and marked; pressure upon the common femoral abolished pulsation, but did not bring about entire subsidence of the swelling; aneurismal bruit distinct; pain great; the most comfortable position being with the limb semiflexed and everted. The continuance of this position for a certain time had caused an incipient bed sore upon the outer side of the foot and little toe. There was no history of syphilis. Aneurism of superficial femoral was evident. Compression was commenced June 26, with two horseshoe tourniquets, having small pads so adjusted as to press upon the femoral between Poupart's ligaments and the aneurism; the tourniquets were, of course, tightened and relaxed alternately. Morphine was given q. s. At the end of ten days but little good had resulted from the use of tourniquets,

although complete as well as partial stoppage of the blood-current had been brought about at different times. *Veratrum viride* was given also, and the pulse by its means kept down.

July 14 I tied the common femoral half an inch below Poupart's ligament with silk. Pulsation was easily felt through the skin, and this, together with subcutaneous connective tissue, being divided, the artery came into view. By pressing the vessel from one side to the other, I was able to feel that no large branch came from it within half an inch or an inch of the place to be tied. One very small vessel was given off just where exposed, so this was tied in addition to the main trunk. Pulsation in the aneurism at once ceased, and did not recur. One end of the ligature was left hanging from the wound; iodoform and absorbent cotton constituted the dressing. Convalescence was without interruption, and calls for no comment. The external border of the foot and little toe, which were denuded before the operation by pressure, became the site of a troublesome ulceration, and healed but slowly, the toe sloughing off. The aneurism consolidated, became very gradually smaller, and was, when last seen, represented by a firm lump, causing no inconvenience.

Fortified by a successful case, I was of course prepared to criticise the opinions of others, and I venture to say that there are few operations in regard to which so many divergent opinions are expressed by competent men. From unqualified condemnation to unqualified praise there is an easy gradation of advice and opinion not only from those who have neither performed nor seen the operation, which need cause no surprise, but singularly enough even from those who have themselves operated. The Irish surgeons approve of the operation, notably Porter, who

gives three cases with recovery, and so well describes the anatomy of the locality, etc., as to justify the expression occasionally used—"Porter's operation."¹ English surgeons, with scarcely an exception, do not favor the operation. Macnamara favors the operation and reports cured cases² including one of his own. Erichsen is strong in opposition³. Holmes⁴ approves the measure rather than to tie the external iliac, while Bryant⁵ requires more experience before recommending it. Pemberton⁶ is the most pronounced in favor of the measure of all surgeons who have written. American surgeons, with but one brilliant exception consider the operation injudicious and inexpedient. Mott⁷ is the exception, and he says, "some surgeons have doubted the propriety of tying the artery between the giving off of the profunda and the origin of the epigastric. We have, however, several times put a ligature here, and in every instance with success." This is very strong endorsement.

A foot-note on the same page states that since the above was written, he—Mott—has again tied the common femoral with success. It is greatly to be regretted that the matter is left in so crude a condition ; no particulars are given about age, sex, cause, manner of operating, etc. The only seeming excuse for such omissions in so careful a writer being, that there could be in Mott's mind no doubt as to the propriety of the procedure and discussion therefore was needless.

¹ Dub. Quart. Journ. Med. Sci., Nov. 1860.

² Brit. Med. Journ., Oct. 1867.

³ Am. Ed., 1878, vol. ii. p. 160.

⁴ Packard's Ed., vol. ii. p. 440.

⁵ Surgery, 2d Am. Ed., p. 352.

⁶ Brit. Med. Journ., Oct. 30, 1875.

⁷ Mott's Velpeau, vol. ii, p. 301.

Continental surgeons are generally not in favor of the operation. The most exhaustive article with which I am acquainted is by Rabe,¹ with an analysis of one hundred and seventy-eight ligations of the common femoral for all causes. In this elaborate summary of our knowledge up to the time of its publication, 1875, a comparison is instituted between ligations of the large arteries of the lower extremity in regard to secondary hemorrhage and gangrene as affecting the general mortality, the outcome being not favorable for the common femoral ligation. Unfortunately, the Irish cases have escaped due credit, Porter² being omitted, as also Smyly. Laugier³ is entirely omitted with two successful cases. An unsuccessful case by Gelston⁴ is likewise omitted.

For aneurism, the vessel under discussion has been tied but a very few times, the enormous majority of ligations being for hemorrhage following traumatism, and Rabe, after collecting and analyzing 540 ligations of the superficial femoral, 178 of the common femoral, 207 of the external iliac, and 27 of the popliteal, for all causes, makes use of the following language: "It is necessary to add that neither of these ligations, in case of traumatic hemorrhage, performed at a distance, prevents more surely the one than the other the recurrence of hemorrhage," a sentence which conveys the highest compliment to the teachings and opinions of Guthrie, that most competent surgeon. Laugier's cases, already referred to, were both wounds of the artery, in which ligatures were applied above and below the seat of injury. Both patients recovered. Rabe disapproves of tying the

¹ Deut. Zeits. f. Chir. V. Nos. 2 und 3 March, 1875.

² Loc. cit.

³ Journ. de Méd. Chem. and Phar., Montpel., 1803, p. 135.

⁴ Med. Press and Circular, Sept. 2, 1868.

common femoral, advising that either the superficial femoral or the external iliac should be secured. Turretta,¹ in Italy, after the recovery of a traumatic case in which, having tied the common femoral above the wound, hemorrhage occurred, and he tied the external iliac, comes to the same conclusion as Rabe. If he had tied the vessel above and below the wound, his conclusion, as well as his practice, would have been better.

In the History of the War, Part 3, Surg. Vol., p. 789, will be found Table CXLI., being a summary of 374 ligations of the femoral artery. A certain number of these refer to the common femoral. I append a brief history of each case, for which I am indebted to the extreme courtesy and kindness of the officials of the Library of the Surgeon-General's Office, not only in affording me every possible facility to investigate, but also in making transcripts of documents beyond my reach.

For traumatic aneurism there is recorded one case, No. XIII., of the table referred to.

Injury to femoral in August, 1864; no primary hemorrhage; aneurismal sac formed; ligation of femoral above profunda, September 1, 1864; ligature separated ninth day; recovery.

For secondary hemorrhage after amputation there are four cases, with two recoveries.

CASE XVII.—Fracture of knee-joint, October 27, 1864; amputation, thigh, October 28; *gangrene* in stump three weeks after operation; secondary hemorrhage on third day; femoral ligated just above profunda; recovery.

CASE XXI.—Fracture of knee-joint, March 31, 1865; amputation, thigh, same day; hemorrhage from pro-

¹ Il Morgagni, 1877, p. 166.

funda, April 4; same day ligation of femoral above profunda; recovery.

CASE CCLXV.—Wound of thigh, August 29, 1862; amputation, same day; hemorrhages, September 5, 6, 7; ligation of femoral above profunda, September 7; hemorrhage recurred September 8; died September 12, 1862.

CASE CCCLXV.—Fracture of femur, May 5, 1864; amputation of thigh, June 2; hemorrhage, June 5, and femoral artery ligated above profunda on the same day; died, June 5, of exhaustion.

For hemorrhage secondary after a wound there are recorded thirteen instances, two of which recovered. This list includes two cases in which the vessel was ligated three-quarters of an inch below Poupart's ligament, and, therefore, presumptively above the profunda, although not stated in so many words.

CASE XXIV.—Wound of thigh, May 16, 1864; secondary hemorrhage, and femoral ligated above profunda, May 29; recovered.

CASE LXXXIX.—Wound of thigh, April 2, 1865; hemorrhage from branch of femoral, April 11; ligation of femoral above profunda in Scarpa's space, April 12; recovery.

CASE CXL.—Wound of thigh, femoral injured, April 1, 1865; April 10, hemorrhage from femoral and descending branch of profunda; femoral ligated on the same day above profunda; *gangrene* of entire limb; died April 19, 1865.

CASE CLXXXIII.—Fracture of femur, May 28, 1864; hemorrhage from profunda, June 19; ligation on same day of femoral just below Poupart's ligament, and above probable origin of profunda; hemorrhage recurred June 20 and 21; wound plugged with persulphate of iron; died, June 25, of exhaustion, following secondary hemorrhage.

CASE CXC.—Wound of thigh, June 1, 1864; June 8, hemorrhage from deep branches of profunda; profunda

ligated one inch below origin; bleeding continuing, the femoral was ligated two inches above the profunda; death, June 15.

CASE CCXI.—Wound of thigh, March 16, 1865; hemorrhage, April 3, from profunda; profunda ligated same day; April 5, femoral ligated just below Poupart's ligament; *gangrene*; death, April 8, 1865, of gangrene.

CASE CCXIII.—Wound of thigh, May 15, 1864; *gangrene* of wounded parts; hemorrhage, May 28, from profunda; femoral ligated same day, one-half inch above profunda; died of gangrene, June 2, 1864.

CASE CCXVII.—Wound of thigh, May 10, 1864; hemorrhage from profunda, May 19; ligation of profunda, same day; hemorrhage recurred May 22; femoral ligated above profunda, May 22; hemorrhage recurred thirty-six hours after—arrested by compression; died May 26, 1864.

CASE CCXIX.—Wound of thigh, June 9, 1864, ball lodging close to femoral; hemorrhage from femoral, July 5; ligation of femoral above profunda on same day; ligature came away July 11; hemorrhage recurred at four different times; died of chronic diarrhœa, September 25, 1864.

CASE CCLXIX.—Wound of thigh, May 18, 1863; great primary hemorrhage (probably ceased spontaneously); June 3, hemorrhage from profunda; ligation of femoral above profunda same day; hemorrhage recurred from branches of internal iliac; death, June 10, 1863, from exhaustion, following hemorrhage.

CASE CCCVII.—Wound of hip, May 12, 1864; hemorrhage, May 28 and 29, from branch of profunda or pudic artery; femoral ligated May 29, three-fourths of an inch below Poupart's ligament; hemorrhage recurred fifty-six hours after operation; death, June 2, from secondary hemorrhage.

CASE CCCXXXIV.—Wound of thigh, May 18, 1864; hemorrhage from circumflex, May 30; June 2, femoral ligated three-fourths of an inch below Poupart's liga-

ment; hemorrhage recurred three hours after operation; died from exhaustion, June 5, 1864.

CASE CCCLIII.—Fracture of femur, May 10, 1864; hemorrhage from femoral, June 7; femoral ligated above profunda, June 9; died, June 17, 1864.

There are certain other cases of the table in which it is likely that the common femoral was tied, but in the absence of specific statement to that effect, and in the absence of knowledge concerning the exact site of the ligature, they must be omitted here.

Gangrene is recorded four times—Cases XXVII., CXL., CCXI., CCXIII.—but no distinction is made between the variety resulting from obstruction to the circulation and that resulting from hospital infection. As the seat of hemorrhage is but rarely stated, whether from the proximal or distal side of the wound, analysis of the cases is not possible. From the large mortality, however, it may be safely inferred that to tie the common femoral for a distal wound, rather than to tie both ends of the vessel in the wound, is to be avoided if possible, for it exposes the patient to needless risk.

As germane to the subject of bleeding from the lower end of a wounded artery, Gelston's¹ case may be cited: The vessel was tied in Porter's canal, July 2d, for aneurism; secondary hemorrhage July 17th, and ligation of external iliac; bleeding occurred from the distal end of the old wound July 19th; the wound was plugged; bleeding recurred several times; death August 1st. I cannot avoid thinking that for traumatic cause this vessel (common femoral), perhaps, has been tied in consequence of its extremely superficial position, and the facility

¹ Loc. cit.

with which the operation is done, as compared with the difficulty of finding a bleeding artery and putting a string on it in a sloughy or deep wound.

For causes not traumatic, elephantiasis, and aneurism, how about tying the common femoral? Rabe gives ten cases in which the vessel was secured for the former cause, elephantiasis, with one death and nine recoveries. The same author gives twelve cases of ligation for spontaneous aneurism, with six recoveries and a like number of deaths; but cases by Porter,¹ Smyly,² Lister,³ Gelston,⁴ and several cases by Mott, probably, are not to be found in his list. Looking at the unfavorable cases, it appears that death is generally brought about by hemorrhage, whether from the proximal or distal end of the artery, is, however, but exceptionally stated. I find an explanation for this secondary hemorrhage in the variable anatomy of the vessel, sometimes being extremely short, sometimes long, according as the profunda commences close to, or at a distance from, Poupart's ligament. The length usually ascribed to the common femoral is from one to two inches, probably more often one than two. A fair average would be one and a quarter inch; and, inasmuch as the separation of a ligature from a tied artery is generally attended with hemorrhage if a large branch be close at hand, the amount of working space afforded the surgeon does not appear excessive, and might be contracted; it must, however, be remembered that variation in origin is not the prerogative of the deep femoral only, but that the epigastric and circumflex ilii are given off by the external iliac at a variable distance from Poupart's ligament.

¹ Loc. cit.

³ Address before Brit. Med. Assoc. 1871.

² Loc. cit.

⁴ Loc. cit.

When, therefore, the common femoral is under consideration with a view to ligation, and the origin of the profunda discussed, due regard must be paid to the possible extent of external iliac without branches above Poupart's ligament; and, should the commencement of the profunda be exposed, the operator will apply the ligature above or below, or tie both vessels according as his judgment may direct after careful examination. Published cases prove that these considerations are not theoretical. Pemberton tied, as he thought, the common femoral, and the patient recovered, death occurring a certain time afterwards from causes foreign to the operation. He was able to examine the parts, and found that he had really tied the superficial femoral, for the profunda arose as high as Poupart's ligament.

Collis, quoted by Macnamara, thought he tied the common femoral; death took place from secondary hemorrhage, and the profunda was found on inspection to be given off immediately above the ligature. The string had been put around the superficial femoral.

In the table already referred to (*Medical and Surgical History of War*), is a somewhat similar case, the particulars of which are as follows:

CASE CXLVIII.—Wound of thigh and injury to femoral, May 31, 1862; hemorrhage June 10th; femoral ligated on the same day, as was supposed, above the profunda; but the profunda being given off unusually high, was also tied; hemorrhage from profunda recurred June 17th, profunda religated same day; died from exhaustion two hours after operation.

Pemberton, in a second case, and Lister have successfully tied with antiseptic catgut; it is possible that this method of tying the artery, under consid-

eration, may reduce the mortality. The common femoral being covered by but skin with connective tissue, can be readily exposed, can be examined by touch and sight, and the presence of a neighboring large branch recognized. Should the limb be œdematous as high as the groin, the application of a horse-shoe tourniquet with the pad over the artery for a short time will render the vessel again superficial. Recourse was had to this expedient in my own case. The fact that the crural sheath encloses a funnel-shaped space much larger than the contained vessels can fill, permits a free examination for the profunda. It will be probably wise, in view of the shape of the crural sheath, to open it freely for another reason, lest drainage occur backwards toward the pelvis rather than outwards. From the study of recorded cases I am led to the following conclusions :

1st. Ligation of common femoral in continuity for distal wound is attended with great mortality, and should not be substituted for the application of ligatures to an artery above and below the point wounded.

2d. Ligation of common femoral for elephantiasis or aneurism, is proper.

3d. The crural sheath should be freely opened and the vessel carefully examined for the origin of the profunda and epigastric, the ligature not to be tied within a half or three-quarters of an inch of either.

4th. Half or three-quarters of an inch below Poupart's ligament will probably be the most favorable locality for the ligature.

5th. The presence of a small branch near the seat of ligature does not contraindicate the operation ; such branch should be also tied.